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a high temperature side heat exchanging unit configured to receive heat from the AMR bed;

a heat transfer fluid path formed by connecting the AMR bed, the low temperature side heat exchanging unit, and the high temperature side heat exchanging unit for circulating a heat transfer fluid,

wherein at least a part of the first magnetic material is formed of a magnetic material shown by a composition formula of  $Gd_{100-x-y}Zr_xY_y$ , wherein  $0 < x < 3.4$  and  $0 \leq y \leq 13.5$ , and

wherein the AMR bed has a low temperature end side and a high temperature end side, the low temperature side heat exchanging unit is disposed to the low temperature end side, the high temperature side heat exchanging unit is disposed to the high temperature end side, the low temperature end side is filled with the first magnetic material, and the high temperature end side is filled with a second magnetic material having a ferromagnetic transition temperature higher than that of the first magnetic material.

2. The apparatus according to claim 1, wherein the AMR bed is filled with the first magnetic material and the second magnetic material having composition different from the first magnetic material in a layered state.

3. The apparatus according to claim 2, wherein the first magnetic material and the second magnetic material are a number of substantially spherical magnetic particles having a maximum diameter of 0.3 mm or more to 2 mm or less.

4. A magnetic refrigeration system comprising:

a magnetic refrigeration apparatus having an AMR bed filled with a magnetic material, magnetic field generation device configured to apply and remove a magnetic field to and from the magnetic material, a low temperature side heat exchanging unit, a high temperature side heat exchanging unit, and a heat transfer fluid path formed by connecting the AMR bed, the low temperature side heat exchanging unit, and the high temperature side heat exchanging unit for circulating a heat transfer fluid, wherein at least a part of the magnetic material is formed of a magnetic material shown by a composition formula of  $Gd_{100-x-y}Zr_xY_y$ , wherein  $0 < x < 3.4$  and  $0 \leq y \leq 13.5$ ;

a cooling unit thermally connected to the low temperature side heat exchanging unit; and

a heat discharge unit thermally connected to the high temperature side heat exchanging unit,

wherein the low temperature side heat exchanging unit is composed of a low temperature bath for storing a low temperature refrigerant and a low temperature side heat exchanger disposed in the low temperature side bath so as to be in contact with the refrigerant.

5. The apparatus according to claim 1, wherein  $0.2 \leq x \leq 3.0$ .

6. The system according to claim 4, wherein  $0.2 \leq x \leq 3.0$ .

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7. The apparatus according to claim 1, wherein a temperature of the first magnetic material at which a maximum peak appears to a change of amount of magnetic entropy is between 258.0 K and 293.5 K inclusive, and an absolute value of the change of amount of magnetic entropy of the first magnetic material at the temperature is between 3.02 J/(kg·K) and 3.31 J/(kg·K) inclusive.

8. The system according to claim 4, wherein a temperature of the magnetic material at which a maximum peak appears to a change of amount of magnetic entropy is between 258.0 K and 293.5 K inclusive, and an absolute value of the change of amount of magnetic entropy of the magnetic material at the temperature is between 3.02 J/(kg·K) and 3.31 J/(kg·K) inclusive.

9. The apparatus according to claim 1, wherein the second magnetic material is Gd.

10. The apparatus according to claim 2, further comprising a partition wall through which the refrigerant can pass, and filled in the layered state so that the first magnetic material and the second magnetic material are not mixed with each other.

11. The system according to claim 4, wherein the high temperature side heat exchanging unit is composed of a high temperature bath for storing a high temperature refrigerant and a high temperature side heat exchanger disposed in high temperature bath so as to be in contact with the refrigerant.

12. A magnetic refrigeration apparatus comprising:

an AMR bed filled with a first magnetic material;

a magnetic field generation device configured to apply and remove a magnetic field to and from the first magnetic material;

a low temperature side heat exchanging unit configured to receive coldness from the AMR bed;

a high temperature side heat exchanging unit configured to receive heat from the AMR bed; and

a heat transfer fluid path formed by connecting the AMR bed, the low temperature side heat exchanging unit, and the high temperature side heat exchanging unit for circulating a heat transfer fluid,

wherein at least a part of the first magnetic material is formed of a magnetic material shown by a composition formula of  $Gd_{100-x-y}Zr_xY_y$ , wherein  $0 < x < 3.4$  and  $0 \leq y \leq 13.5$ ,

and wherein the AMR bed is filled with the first magnetic material and a second magnetic material having composition different from the first magnetic material after they are mixed with each other.

13. The apparatus according to claim 12, wherein the second magnetic material is Gd.

14. The apparatus according to claim 12, wherein the first magnetic material and the second magnetic material are a number of substantially spherical magnetic particles having a maximum diameter of 0.3 mm or more to 2 mm or less.

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